FAT SHARK
RC VISION SYSTEMS

PREDATOR V2 CE

RTF FPV KIT

USER MANUAL

Revision B 09/21/2013

For more product information, please visit:
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Introduction

Congratulations on purchasing the Fat Shark Predator RTF FPV video piloting system with goggles, transmitter and camera. To ensure your continued enjoyment, please take the time to thoroughly read through this operating manual before using.

Product Compatibility

The Predator has been designed to adhere to established video standards and is compatible with any product also adhering to accepted video standards. Due to the high number of different manufacturers and variation in quality, it's impossible to for us to have tested with every product combination and some troubleshooting may be required if mix/matching components. The Predator has been thoroughly tested with ImmersionRC gear. For best results and no compatibility issues, Fat Shark recommends ImmersionRC gear for your accessory products.

IMPORTANT!!!! Product Warning!!!!!
DO NOT LEAVE HEADSET EXPOSED TO DIRECT SUNLIGHT. SUNLIGHT WILL MAGNIFY THROUGH THE OPTICS AND BURN HOLES IN THE LCD COLOR FILTER THIS WILL NOT BE COVERED BY WARRANTY. KEEP GOGGLES IN PROTECTIVE CASE WHEN NOT IN USE

Product contents

Carry case

Predator Headset

FPV Downlink (camera, TX, filter)

AV cable

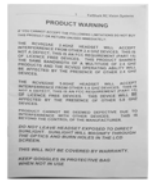
5G8 Antenna (2p)

(headset and transmitter)

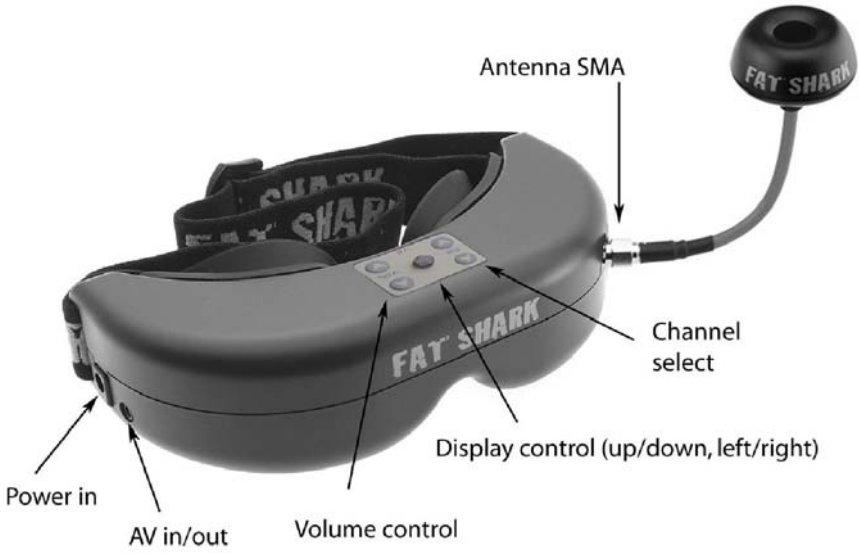
Battery

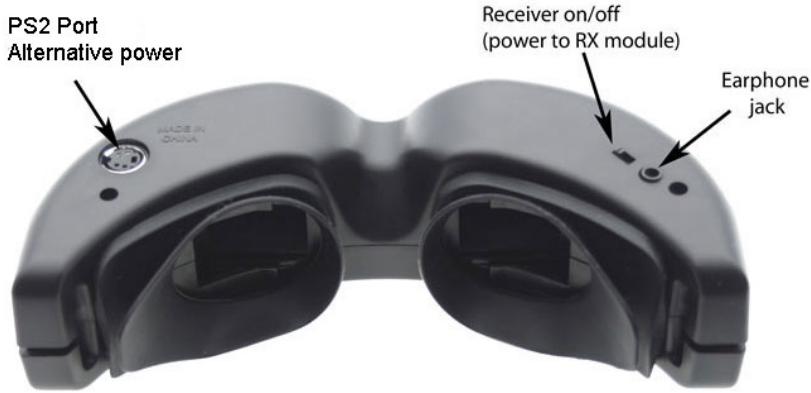
(with discharge adapter)

Manual



Controls Diagram





Controls

Brightness/contrast control: pressing left and right increases/decreases display contrast. Press forward/back increases/decreases brightness.

RX power switch: The receiver module power is controlled by this switch. If viewing video source via the AV cable; the RX module needs to be turned off to avoid image conflict.

Channel select: Pressing channel up/down buttons will cause the channel to incrementally increase/decrease. Audio beep sounds on channel change. A long beep sounds on channel top and bottom limits.

Note: Fat Shark only guarantees compatibility with Fat Shark or ImmersionRC transmitters.

CH1: 5740 MHz CH2: 5760 MHz CH3: 5780 MHz CH4: 5800 Mhz
CH5: 5820 MHz CH6: 5840 Mhz CH7: 5860 MHz

Low battery warning: Audio warning if input voltage drops below 6.8V

Volume control: each press of button increments volume up or down. Standard earphones can be used with the Predator (not included).

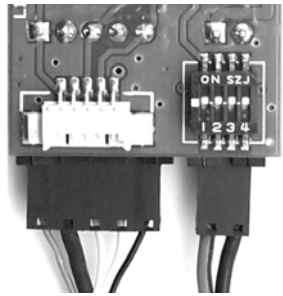
Downlink Overview (Camera, TX, Power)

Downlink system comes preassembled and tested for plug/play with your aircraft. Simply connect the balance lead of your 2S to 4S (7V - 25V) RC battery to provide power to your Fat Shark Downlink and you are ready to fly.
The handy balance lead filters RC servo and motor noise from your RC pack for a crisp, clear image.

Transmitter

Channel select chart:

	1	2	3	4
Ch1 5740 MHz	On	On	On	N/A
Ch2 5760 MHz	Off	On	On	N/A
Ch3 5780 MHz	On	Off	On	N/A
Ch4 5800 Mhz	Off	Off	On	N/A
Ch5 5820 MHz	On	On	Off	N/A
Ch6 5840 Mhz	Off	On	Off	N/A
Ch75860 MHz	On	Off	Off	N/A



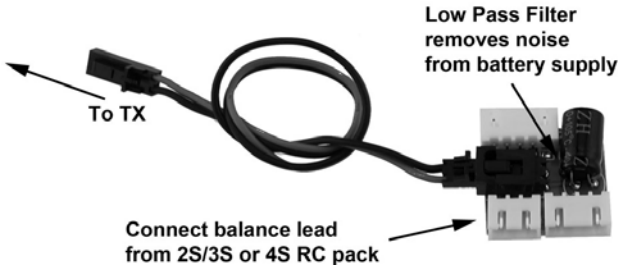
Small white connector on back of transmitter is for ImmersionRC Tiny Telemetry. See accessories.

Camera

2.8mm lens for wide angle 100 degree FOV; ideal for fixed camera piloting.
Camera is NTSC/PAL selectable (NTSC default, remove jumper on back for PAL).
Plugs camera directly into TX via included cable (pre assembled).

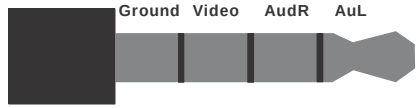
Power (via discharge filter supply)

The discharge filter supply allows you to power your downlink equipment from your onboard RC pack. Connect as shown below:



AV in/out Port

RCA Connector: Yellow: Video, White: Audio Left, Red: Audio Right



Recording Video

Connect AV cable to AV out port on right side of headset. Connect recording device to cables and set up as per manufacturer directions.
Note: Cables pins are not all the same (see above chart), be sure to connect to headset using the included cable.

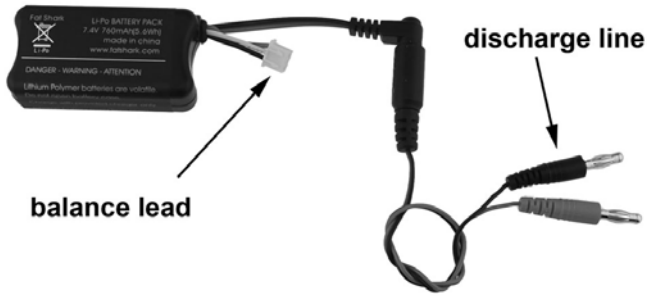
Using an external receiver:

Use the AV cable to connect headset to the RCA AV port of external devices.
To share the base station power supply with your goggles, pick up a 3m Dominator AV cable accessory from your retailer. Note; internal receiver must be shut off to properly display external AV.

Battery Charging

The 1000 mAh 7.4V lithium polymer battery pack is equipped with a 3 pole balance charger lead that allows the battery to be charged off standard RC battery pack chargers (not included). Follow your charger instructions for setting up for 760 mA 7.4V Li-po. Some chargers require the discharge cable to be connected. Use the enclosed discharge lead adapter for these types of chargers.

Connection to Standard RC Chargers



Note (1): If the charger fails to announce charge complete, but is showing battery voltage at 8.4V, the charge can be considered finished.
DO NOT LEAVE BATTERY ATTACHED TO CHARGER WHEN CHARGER IS NOT PLUGGED IN.
Note (2): If battery becomes fully discharged or shorted an internal safety circuit will trip To reset the battery, tap 9V direct to the barrel connector via the discharge adapter cable's banana connector. This will instantly reset the battery and it can be recharged as normal.

Accessories

Diopter lens

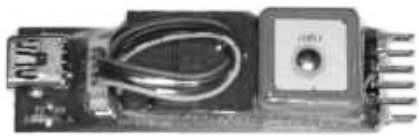
For near sighted users, diopter lens insert sets are available that include -2, -4 and -6 dpt. See below insert instructions. Lens orientation is not critical.

Tiny Telemetry from ImmersionRC

Conventional OSDs offer a host of features, some of which you don't need if you're just flying FPV around your local field or have a small and light FPV plane that can't really carry a full OSD. All you really want in those cases is for your tracking antenna to point at the plane accurately and have GPS positional data along with vital statistics such as battery voltage and current consumption.

TinyTelemetry is a minimal GPS locator that sends EzTelemetry data for the EzAntennaTracker down one of the audio channels on the audio/video transmitter. The EzAntennaTracker will then track the plane and offer battery statistics on its LCD display as well as other telemetry data such as positional info etc.
The new v2.0 EzAntennaTracker will also offer audible warnings for battery voltage and total current consumption.

The Tiny Telemetry plugs into the transmitter's dongle power supply located on the back of the transmitter.



Specifications

Headset Specifications

Optics:

- FOV 25 degrees diagonal
- Interpupillary (IPD) distance: 63.5mm (fixed)
- Optional diopter lens inserts available in -2, -4, -6 dpt

Audio:

- Stereo

User Controls:

- Channel selection
- Contrast/brightness
- Volume adjustment

Electrical:

- Power supply, 7-13V (2S/3S supply)
- Power consumption: 200/350mA (direct/wireless)

Battery:

- 7.4V 1000mAh lithium polymer with safety circuit.

System:

- NTSC/PAL auto select
- Interlaced only (not progressive scan)

Mechanical:

- Ergonomic molded shape with adjustable headband
- Rubber eye cups for ambient light reduction.
- Weight: 163g

Display

- Two full color micro VGA LCD's (640 X 480 lines)
- Resolution 922,000 pixels per eye

Head Tracker

- None (removed for V2)

Receiver

- 5.8Ghz 7ch

Interface

- 3.5mm 4p AV in/out port
- Power in port
- 3.5mm 3p Earphone port
- PS/2 Power port (alternative headset supply from Futaba or ezUHF)

Camera Specifications:

Electrical:
- Power supply: 3.5-5V (powered off TX)
- Power consumption: 60mA @5V)

Imager:
- 1/3" CMOS 600TVL
- FPV tuned white balance and sampling.
- NTSC/ PAL selectable via jumper on camera (jumper on = NTSC).

Lens:
- 2.8mm IR coated
- 100° diagonal FOV (ideal for fixed camera)

Mechanical:
- Square: 21 X 21 X 12mm
- Lens extrude: 15mm X 14mm diameter
- Weight: 15g

Transmitter Specifications:

Electrical:
- Power supply: 7 - 25 V (2S-6S supply)
- Power consumption 50mA @12V
- Transmitting power: 25mW
- Frequency: 5G8 (see above frequency chart)

Antennae:
- Circular polarized dipole

Mechanical:
- 55 X 26 X 11 mm
- Weight: 25g (with antenna).

Downlink Kit

- Power supply: 7 - 13 V (2S-6S supply)
- Power consumption 100mA @12V
  Powered via battery balance lead
- Total weight: 45g (with antenna).

Operational advice

- **For best performance**, select a channel that has the least amount of interference. While the transmitter is turned OFF, turn on the video headset and look at the screen as you check each channel. Clear channels will have a consistent static background. Channels with interference will have horizontal static lines.
- **Always perform a range test before flying**. This includes AV and RC controls. Some RC receivers can be affected by the proximity of other electronic devices particularly the AV TX.
- Try to space out your components as much as possible to avoid interference to your RC control range (keep stuff away from RX)
- Until experienced, practice flying in a familiar area to avoid becoming disorientated.
- Due to antenna characteristics, there is a "null" in line with antenna direction. You may experience excessive video breakup when flying overhead
- 5.8Ghz signal strength drops off very fast, stay safely within solid AV range.
- **For maximum distance** it is very important that a clear line of sight exists between the transmitter and the video headset. 2 of the worst causes of interference are human bodies and reinforced concrete.
- Place your TX antenna in open area in a vertical orientation
- **Multipathing** (reflections off buildings/ tall objects) causes signal cancellation and result in broken video. Fly in open areas away from buildings or other tall structures (i.e. barns, hills).
- **5.8Ghz AV with 2.4Ghz RC controllers:** 2.4Ghz may cause harmonic interference on Ch2 – Ch7 of the 5.8Ghz AV (Ch1 not affected). The headset has been equipped with a high pass filter that will allow the system to work with CE certified 2.4Ghz RC controllers. However, the filtering may be insufficient to remove noise from overpowered non CE certified controllers.
  If you experience interference from your RC radio, change the AV channel to channel 1.
- Although you don't require any license to operate this device, you are still legally responsible for operating in a responsible manner.

Trouble shooting

Observation	Possible cause/solution
No image, display is completely dark	- No power supplied. Check power connections.
No image, display is glowing dark grey	- If using wireless module, turn on RX power on bottom of headset. - If using AV in cable, check video source. - Ensure TX is on and camera connections solid
Lots of interference lines (horizontal lines)	- Choose a cleaner channel.
Lots of interference lines (horizontal lines) when using 5.8Ghz receiver	Check to see if cause is harmonic interference from 2.4Ghz RC controller (turn radio on/off). - Use CH1 on TX/headset (Ch1 not affected by 2.4Ghz) - check correct frequency antenna is used
Battery DOA	Low voltage switch tripped, read notes (2) in battery section
Battery won't charge	Low voltage switch tripped, read notes (2) in battery section disengaged from socket (open and reseat).
Short range	- Ensure 5.8Ghz antenna was installed - Check for other sources of interference - Ensure transmitter has clear LOS to headset. Test in wide open area, away from any obstructions
Short range (con't)	- Ensure that a compatible antenna is installed. Do not use other manufacture antenna, they may be dual band or may be reverse SMA (no center pin to connect to receiver)
Short range (con't)	95% of range issues is due to incorrect mounting of TX and antenna. Ensure antenna has clear line of sight and clear of any parts of RC craft.
White dots on LCD display	You were careless and left goggles exposed to sun. Sun burnt off LCD color filter.

Warranty

The system can be exchanged for a new unit within 30 days for any manufacturing defects if returned in new condition. The video headset will be warranted for repair for 2 years if no signs of excessive use. Buyer will be responsible for shipping costs. If beyond the warranty period we will provide repair services.

Your 1st point of contact for all warranty issues is your retailer. We also run a support forum for all technical issues at:
http://fpvlab.com/ SPONSORS GATE/ FAT SHARK
Post your questions there and they will be answered by our technical staff or peers.

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